REMARKS

Claims 1-13 are pending in the Application. Claims 1-13 are rejected under 35 U.S.C. §103(a). Applicants respectfully traverse these rejections for at least the reasons stated below and respectfully request that the Examiner reconsider and withdraw these rejections.

I.   REJECTIONS UNDER 35 U.S.C. §103(a):

The Examiner has rejected claims 1-13 under 35 U.S.C. §103(a) as being unpatentable over Lundahl et al. (U.S. Patent No. 6,636,862) (hereinafter "Lundahl") in view of Heckerman (U.S. Patent No. 6,529,891). Applicants respectfully traverse these rejections for at least the reasons stated below and respectfully request the Examiner to reconsider and withdraw these rejections.

A.   The Examiner has not provided any objective evidence or source of motivation for combining Lundahl with Heckerman.

A *prima facie* showing of obviousness requires the Examiner to establish, *inter alia*, that the prior art references teach or suggest, either alone or in combination, all of the limitations of the claimed invention, and the Examiner must provide a motivation or suggestion to combine or modify the prior art reference to make the claimed inventions. M.P.E.P. §2142. The showings must be clear and particular and supported by objective evidence. *In re Lee*, 277 F.3d 1338, 1343, 61 U.S.P.Q.2d 1430, 1433-34 (Fed. Cir. 2002); *In re Kotzab*, 217 F.3d 1365, 1370, 55 U.S.P.Q.2d 1313, 1317 (Fed. Cir. 2000); *In re Dembiczak*, 50 U.S.P.Q.2d. 1614, 1617 (Fed. Cir. 1999). Broad conclusory statements regarding the teaching of multiple references, standing alone, are not evidence. *Id*.

The Examiner admits that Lundahl does not teach a cluster having a set of buckets for each variable[1], as recited in claim 1 and similarly in claim 13. Paper No.

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[1] The Examiner asserts that "Lundahl does not teach the bucket variable of a cluster variable in the model." Paper No. 5, page 3. Applicants are interpreting this statement to mean that the Examiner is asserting that Lundahl does not teach a cluster having a set of buckets for each variable.

5, page 3. The Examiner's motivation for modifying Lundahl with Heckerman to have a cluster having a set of buckets for each variable, as recited in claim 1, is "for easing to group clustered data into clusters such that belonging to the same cluster have a high degree of similarity." Paper No. 5, page 4. The Examiner's motivation is insufficient to support a *prima facie* case of obviousness for at least the reasons stated below.

The Examiner has not presented a source for his motivation for modifying Lundahl with Heckerman. The Examiner simply states "for easing to group clustered data into clusters such that belonging to the same cluster have a high degree of similarity" as motivation for modifying Lundahl with Heckerman to have a cluster having a set of buckets for each variable. The motivation to modify Lundahl with Heckerman must come from one of three possible sources: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998). The Examiner has not provided any evidence that his motivation comes from any of these sources. Instead, the Examiner is relying upon his own subjective opinion which is insufficient to support a *prima facie* case of obviousness. *In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002). Consequently, the Examiner's motivation is insufficient to support a *prima facie* case of obviousness for rejecting claims 1-9 and 13. *Id.*

Furthermore, the Examiner's motivation does not address as to why one of ordinary skill in the art with the primary reference (Lundahl) in front of him would modify Lundahl to have a cluster having a set of buckets for each variable in light of the teachings of the secondary reference (Heckerman). Lundahl teaches that it is a paramount object of the present invention to allow for the incorporation of the respective independent qualities of objects into models, qualities that define predictive relationships between independent objects. Column 2, lines 23-30. Lundahl further teaches the dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices. Column 1, lines 8-10. Heckerman, on the other hand, teaches a desire to improve Bayesian networks with

tree distributions. Column 5, lines 36-38. Heckerman further teaches that the present invention automatically determines the number of clusters using an array of mixtures of Bayesian networks. Column 7, lines 20-21. The Examiner has not provided any objective evidence as to why one of ordinary skill in the art would modify Lundahl, which teaches the dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices, with Heckerman, which teaches automatically determining the number of clusters using an array of mixtures of Bayesian network. That is, the Examiner has not provided any objective evidence as to why one of ordinary skill in the art would modify Lundahl to have a cluster having a set of buckets for each variable in view of Heckerman, which teaches automatically determining the number of clusters using an array of mixtures of Bayesian network. The Examiner is merely relying upon his own subjective opinion which is insufficient to support a *prima facie* case of obviousness. *In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002). Consequently, the Examiner's motivation is insufficient to support a *prima facie* case of obviousness for rejecting claims 1-9 and 13. *Id.*

Furthermore, the Examiner admits that Lundahl does not teach selecting the result with the highest quality index as an end result of the data clustering, as recited in claim 10. Paper No. 5, page 6. The Examiner's motivation for modifying Lundahl with Heckerman for selecting the result with the highest quality index as an end result of the data clustering, as recited in claim 10, is "for easing to group clustered data into clusters such that belonging to the same cluster have a high degree of similarity." Paper No. 5, page 6. The Examiner's motivation is insufficient to support a *prima facie* case of obviousness for at least the reasons stated below.

The Examiner has not presented a source for his motivation for modifying Lundahl with Heckerman. The Examiner simply states "for easing to group clustered data into clusters such that belonging to the same cluster have a high degree of similarity" as motivation for modifying Lundahl with Heckerman for selecting the result with the highest quality index as an end result of the data clustering. The motivation to modify Lundahl with Heckerman must come from one of three possible

sources: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998). The Examiner has not provided any evidence that his motivation comes from any of these sources. Instead, the Examiner is relying upon his own subjective opinion which is insufficient to support a *prima facie* case of obviousness. *In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002). Consequently, the Examiner's motivation is insufficient to support a *prima facie* case of obviousness for rejecting claim 10. *Id.*

Furthermore, the Examiner's motivation does not address as to why one of ordinary skill in the art with the primary reference (Lundahl) in front of him would modify Lundahl for selecting the result with the highest quality index as an end result of the data clustering in light of the teachings of the secondary reference (Heckerman). Lundahl teaches that it is a paramount object of the present invention to allow for the incorporation of the respective independent qualities of objects into models, qualities that define predictive relationships between independent objects. Column 2, lines 23-30. Lundahl further teaches the dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices. Column 1, lines 8-10. Heckerman, on the other hand, teaches a desire to improve Bayesian networks with tree distributions. Column 5, lines 36-38. Heckerman further teaches that the present invention automatically determines the number of clusters using an array of mixtures of Bayesian networks. Column 7, lines 20-21. The Examiner has not provided any objective evidence as to why one of ordinary skill in the art would modify Lundahl, which teaches the dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices, with Heckerman, which teaches automatically determining the number of clusters using an array of mixtures of Bayesian network. That is, the Examiner has not provided any objective evidence as to why one of ordinary skill in the art would modify Lundahl for selecting the result with the highest quality index as an end result of the data clustering in view of Heckerman, which teaches automatically determining the number of clusters using an array of mixtures of Bayesian network. The Examiner is merely relying upon his own subjective opinion which is insufficient to

support a *prima facie* case of obviousness. *In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002). Consequently, the Examiner's motivation is insufficient to support a *prima facie* case of obviousness for rejecting claim 10. *Id.*

Furthermore, the Examiner admits that Lundahl does not teach performing a number of iterations to improve the quality index, as recited in claim 11. Paper No. 5, page 7. The Examiner's motivation for modifying Lundahl with Heckerman for performing a number of iterations to improve the quality index, as recited in claim 11, is "for easing to group clustered data into clusters such that belonging to the same cluster have a high degree of similarity." Paper No. 5, page 7. The Examiner's motivation is insufficient to support a *prima facie* case of obviousness for at least the reasons stated below.

The Examiner has not presented a source for his motivation for modifying Lundahl with Heckerman. The Examiner simply states "for easing to group clustered data into clusters such that belonging to the same cluster have a high degree of similarity" as motivation for modifying Lundahl with Heckerman for performing a number of iterations to improve the quality index. The motivation to modify Lundahl with Heckerman must come from one of three possible sources: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998). The Examiner has not provided any evidence that his motivation comes from any of these sources. Instead, the Examiner is relying upon his own subjective opinion which is insufficient to support a *prima facie* case of obviousness. *In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002). Consequently, the Examiner's motivation is insufficient to support a *prima facie* case of obviousness for rejecting claims 11-12. *Id.*

Furthermore, the Examiner's motivation does not address as to why one of ordinary skill in the art with the primary reference (Lundahl) in front of him would modify Lundahl for performing a number of iterations to improve the quality index in light of the teachings of the secondary reference (Heckerman). Lundahl teaches that

it is a paramount object of the present invention to allow for the incorporation of the respective independent qualities of objects into models, qualities that define predictive relationships between independent objects. Column 2, lines 23-30. Lundahl further teaches the dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices. Column 1, lines 8-10. Heckerman, on the other hand, teaches a desire to improve Bayesian networks with tree distributions. Column 5, lines 36-38. Heckerman further teaches that the present invention automatically determines the number of clusters using an array of mixtures of Bayesian networks. Column 7, lines 20-21. The Examiner has not provided any objective evidence as to why one of ordinary skill in the art would modify Lundahl, which teaches the dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices, with Heckerman, which teaches automatically determining the number of clusters using an array of mixtures of Bayesian network. That is, the Examiner has not provided any objective evidence as to why one of ordinary skill in the art would modify Lundahl for performing a number of iterations to improve the quality index in view of Heckerman, which teaches automatically determining the number of clusters using an array of mixtures of Bayesian network. The Examiner is merely relying upon his own subjective opinion which is insufficient to support a *prima facie* case of obviousness. *In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002). Consequently, the Examiner's motivation is insufficient to support a *prima facie* case of obviousness for rejecting claims 11-12. *Id.*

B.   The Examiner has not presented a reasonable expectation of success when combining Lundahl with Heckerman.

The Examiner must present a reasonable expectation of success in combining Lundahl with Heckerman in order to establish a *prima facie* case of obviousness. M.P.E.P. §2143.02.

As stated above, Lundahl teaches that it is a paramount object of the present invention to allow for the incorporation of the respective independent qualities of objects into models, qualities that define predictive relationships between independent

objects. Column 2, lines 23-30. Lundahl further teaches the dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices. Column 1, lines 8-10.

Heckerman, on the other hand, teaches a desire to improve Bayesian networks with tree distributions. Column 5, lines 36-38. Heckerman further teaches that the present invention automatically determines the number of clusters using an array of mixtures of Bayesian networks. Column 7, lines 20-21.

The Examiner has not presented any evidence that there would be a reasonable expectation of success in combining Lundahl, which teaches dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices, with Heckerman, which teaches automatically determining the number of clusters using an array of mixtures of Bayesian networks. The Examiner must provide objective evidence as to how dynamically analyzing data represented in distinct matrices is combined with determining the number of clusters using an array of mixtures of Bayesian networks. M.P.E.P. §2143.02. Since the Examiner has not provided such evidence, the Examiner has not presented a reasonable expectation of success in combining Lundahl with Heckerman. M.P.E.P. §2143.02. Accordingly, the Examiner has not presented a prima facie case of obviousness in rejecting claims 1-13. M.P.E.P. §2143.02.

> C.   By combining Lundahl with Heckerman, the principle of operation of Lundahl would change.

If the proposed modification or combination of the prior art would change the principle of the operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 270 F.2d 810, 123 U.S.P.Q. 349 (C.C.P.A. 1959). Further, if the proposed modification would render the prior art invention being modified unsatisfactorily for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). For the reasons discussed below, Applicants submit that by combining Lundahl with

Heckerman, the principle of operation in Lundahl would change and subsequently render the operation of Lundahl to perform its purpose unsatisfactorily.

As stated above, Lundahl teaches that it is a paramount object of the present invention to allow for the incorporation of the respective independent qualities of objects into models, qualities that define predictive relationships between independent objects. Column 2, lines 23-30. Lundahl further teaches the dynamic analysis of data, especially data represented in distinct matrices, for example, X, Y and Z data matrices. Column 1, lines 8-10.

Heckerman, on the other hand, teaches a desire to improve Bayesian networks with tree distributions. Column 5, lines 36-38. Heckerman further teaches that the present invention automatically determines the number of clusters using an array of mixtures of Bayesian networks. Column 7, lines 20-21.

By combining Lundahl with Heckerman, Lundahl would no longer be able to dynamically analyze data represented in distinct matrices. As stated above, Lundahl teaches that its purpose is to allow for the incorporation of the respective independent qualities of objects into models, qualities that define predictive relationships between independent objects. Lundahl accomplishes this purpose by dynamically analyzing data represented in distinct matrices. However, as stated above, Heckerman teaches that its purpose is to improve Bayesian networks with tree distributions. By combining Lundahl with Heckerman, Lundahl would be modified to determine the number of clusters using an array of mixtures of Bayesian networks. Hence, by combining Lundahl with Heckerman, Lundahl would no longer be able to accomplish its purpose which is to allow for the incorporation of the respective independent qualities of objects into models, qualities that define predictive relationships between independent objects. Thus, by combining Lundahl with Heckerman, the principle of operation in Lundahl would change, and subsequently render the operation of Lundahl to perform its purpose unsatisfactorily. Therefore, the Examiner has not presented a *prima facie* case of obviousness for rejecting claims 1-13. *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984); *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (C.C.P.A. 1959).

D.   Lundahl and Heckerman, taken singly or in combination, do not teach
     or suggest the following claim limitations.

Applicants respectfully assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining a foreground frequency of a bucket within a first cluster" as recited in claim 1 and similarly in claim 13. The Examiner cites column 6, lines 58-67; column 20, lines 25-38 and Figure 9 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 3. Applicants respectfully traverse and assert that Lundahl instead teaches calculating an index for each partition of the dot matrix X and Y. Column 20, lines 25-38. Lundahl further teaches that $S_{x,i}$ can be used to determine which class x is closest to. Column 6, lines 59-61. There is no language in the cited passages of determining a foreground frequency. Applicants performed a search of the term "frequency" in Lundahl and were unable to identify the term "frequency" or any variation thereof. Neither is there any language in the cited passages that teaches determining a foreground frequency of a bucket. Neither is there any language in the cited passages that teaches determining a foreground frequency of a bucket within a first cluster. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1 and 13, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining a background frequency of the bucket with respect to all of the clusters" as recited in claim 1 and similarly in claim 13. The Examiner cites column 8, lines 65-67 and column 10, lines 1-10 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 3. Applicants respectfully traverse and assert that Lundahl instead teaches that a segmentation or cluster analysis is performed on the Y data matrix which represents the consumers' answers to twenty demographic and lifestyle questions. Column 8, line 65 – column 9, line 1. Lundahl further teaches that that once a family of models has been created an optimization routine is applied to provide an interested user with the optimal X for a given Z which maximizes Y. Column 10, lines 3-6. There is no language in the

cited passages of determining a background frequency. Applicants performed a search of the term "frequency" in Lundahl and were unable to identify the term "frequency" or any variation thereof. Neither is there any language in the cited passages that teaches determining a background frequency of the bucket. Neither is there any language in the cited passages that teaches determining a background frequency of the bucket with respect to all of the clusters. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1 and 13, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "comparing the foreground and background frequencies" as recited in claim 1 and similarly in claim 13. The Examiner cites column 7, lines 52-57 of and column 12, lines 52-59 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 3. Applicants respectfully traverse and assert that Lundahl instead teaches that if the modeling power of variable j in class i is "high", then the product of the residuals for variable j in class i must be relatively low compared to the sample variance of variable j in class i. Column 7, lines 52-55. Lundahl further teaches that assuming that tol is a very small number, a decision is made by comparing nrmdif with tol. Column 12, lines 52-55. Lundahl further teaches that a measure of similarity between P_{new} and P_{old} normalized by norm P_{new} is calculated, specifically: $nrmdif=[norm(P_{new})-norm(P_{old})]/norm(P_{new})$ where norm(A) is the largest singular value of the matrix A. Column 12, lines 46-51. The Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that "tol" and "nrmdif" teach background and foregoing frequencies. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). That is, the Examiner must provide extrinsic evidence that must make clear that "tol" and "nrmdif" teach background and foregoing frequencies, and that it would be so recognized by persons of ordinary skill. *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). Since the Examiner has not provided such evidence, the Examiner is merely relying upon his own subjective opinion which is insufficient to establish a *prima facie* case of obviousness. *See In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir.

2002); M.P.E.P. §2143. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1 and 13, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining a quality index based on the comparison" as recited in claim 1 and similarly in claim 13. The Examiner cites column 3, lines 40-46 and column 10, lines 47-67 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 3. Applicants respectfully traverse and assert that Lundahl instead teaches that a method and system that allows for the incorporation of the respective independent qualities of objects into models, qualities that define predictive relationships between independent objects. Column 3, lines 42-46. Lundahl further teaches that the data analyzed could be related to e-commerce, the various data matrices including: numerical measures of the outcomes of an e-commerce sales event; common measures of qualities of an e-commerce consumer; and common measures of the qualities of the item or set of items offered to the consumer during the e-commerce sales event. Column 10, lines 47-53. There is no language in the cited passages that teaches determining a quality index. Neither is there any language in the cited passages that teaches determining a quality index based on the comparison between the foreground and background frequencies. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1 and 13, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining a quality index for each result of the data clustering operations" as recited in claim 10. The Examiner cites column 3, lines 40-46 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 6. Applicants respectfully traverse and assert that Lundahl instead teaches a method and system that allows for the incorporation of the respective independent

qualities of objects into models, qualities that define predictive relationships between independent objects. Column 3, lines 43-46. There is no language in the cited passage that teaches determining a quality index. Neither is there any language in the cited passage that determines a quality index for each result of the data clustering operations. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 10, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "selecting the result with the highest quality index as an end result of the data clustering" as recited in claim 10. The Examiner cites column 19, lines 2-10 and column 29, lines 8-15 of Lundahl as teaching selecting the result of the data clustering. Paper No. 5, page 6. The Examiner further cites column 20, lines 38-50 and column 21, lines 45-60 of Heckerman teachings the highest quality index as an end result of the data clustering. Paper No. 5, page 6. Applicants respectfully traverse.

Lundahl instead teaches that an object of the present invention is to find a method by which to order the data so as to achieve consistent and good results. Column 19, lines 9-11. Lundahl further teaches that the rows of the original Y data matrix are first classified as belong to a certain group or are classified as outliers. Column 29, lines 7-9. Applicants were unable to identify any language in the cited passages that teaches selecting a result of data clustering.

Heckerman instead teaches to determine whether the various combinations of the number states of the discrete cluster variable and discrete hidden variables has been exhausted. Column 20, lines 38-40. Heckerman further teaches that a determination is made as to whether the various combinations of the number of states of the discrete cluster variable and discrete hidden variables have been exhausted. Column 21, lines 55-58. There is no language in the cited passages in Heckerman that teaches a highest quality index. Neither is there any language in the cited

passages in Heckerman that teaches a highest quality index as an end result of the data clustering.

Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 10, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining a quality index for the clusters" as recited in claim 11. The Examiner cites column 3, lines 40-46 and column 10, lines 47-67 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 7. Applicants respectfully traverse and assert that Lundahl instead teaches a method and system that allows for the incorporation of the respective independent qualities of objects into models, qualities that define productive relationships between independent objects. Column 3, lines 43-46. Lundahl further teaches that in an example, the data analyzed could be related to e-commerce, the various data matrices including: numerical measures of the outcomes of an e-commerce sales event; common measures of qualities of an e-commerce consumer; and common measures of the qualities of the item or set of items offered to the consumer during the e-commerce sales event. Column 10, lines 47-53. There is no language in the cited passages that teaches a quality index. Neither is there any language in the cited passages that teaches determining a quality index for the clusters. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 11, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "performing a number of iterations to improve the quality index" as recited in claim 11. The Examiner cites column 18, lines 1-40 of Heckerman as teaching performing a number of iterations. Paper No. 5, page 7. The Examiner further cites column 13, lines 8-67 and column 14, lines 1-8 of

Lundahl as teaching improving the quality index. Paper No. 5, page 8. Applicants respectfully traverse.

Lundahl instead teaches that for each sample, g-1 of the points are held fixed, while different points from the data set are substituted for the remaining point. Column 15, lines 2-4. There is no language in the cited passage in Lundahl that teaches a quality index. Neither is there any language in the cited passage in Lundahl that teaches improving the quality index. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 11, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Claims 2-9 recite combinations of claim 1 and thus are patentable over Lundahl in view of Heckerman for at least the above-stated reasons that claim 1 is patentable over Lundahl in view of Heckerman. Claim 12 recites combinations of claim 11 and thus is patentable over Lundahl in view of Heckerman for at least the above-stated reasons that claim 11 is patentable over Lundahl in view of Heckerman. Claims 2-9 and 11 recite additional features, which, in combination with the features of the claims upon which they depend, are not patentable over Lundahl in view of Heckerman.

For example, Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "wherein said comparing step further comprises subtracting the relative foreground and background frequencies" as recited in claim 2. The Examiner cites column 4, lines 62-67; column 5, lines 1-4 and column 6, lines 50-58 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 4. Applicants respectfully traverse and assert that Lundahl instead teaches that assuming Y is a matrix, mean centering or centering of Y is defined as subtracting the mean of a given column from each element of that column. Column 4, lines 63-65. Lundahl further teaches that a matrix Y refers to the division of each entry in a given column by the sample standard deviation of that column. Column 5, lines 1-3. Lundahl further teaches that $S_{x,i}$ can be used to determine which class x is closest to. Column 6, lines

59-61. There is no language in the cited passages that teaches subtracting the relative foreground and background frequencies. The Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that subtracting the mean of a given column from each element of that column teaches subtracting the relative foreground and background frequencies. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). That is, the Examiner must provide extrinsic evidence that must make clear that subtracting the mean of a given column from each element of that column teaches subtracting the relative foreground and background frequencies, and that it would be so recognized by persons of ordinary skill. *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). Since the Examiner has not provided such evidence, the Examiner is merely relying upon his own subjective opinion which is insufficient to establish a *prima facie* case of obviousness. *See In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002); M.P.E.P. §2143. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 2, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "squaring the result of the comparison" as recited in claim 3. The Examiner cites column 5, lines 9-22 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 4. Applicants respectfully traverse and assert that Lundahl instead teaches taking square root of the average square difference between elements of $Y(:,i)$ and $Y_{est}(:,i)$. Column 5, lines 10-14. There is no language in the cited passage that teaches squaring the result of comparison discussed above. The Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that taking the square root of the average square difference between elements of $Y(:,i)$ and $Y_{est}(:,i)$ teaches squaring the result of comparison discussed above. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). That is, the Examiner must provide extrinsic evidence that must make clear that taking the square root of the average square difference between elements of $Y(:,i)$ and $Y_{est}(:,i)$ teaches squaring the result of comparison discussed above, and that it would be so recognized by persons of

ordinary skill. *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). Since the Examiner has not provided such evidence, the Examiner is merely relying upon his own subjective opinion which is insufficient to establish a *prima facie* case of obviousness. *See In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002); M.P.E.P. §2143. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 3, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining an optimal number of clusters; and comparing the optimal number of clusters to the actual number of clusters resulting from the clustering data processing operation" as recited in claim 4. The Examiner cites column 8, lines 65-67; column 9, lines 1-10; column 13, lines 55-67; column 14, lines 1-2 and Figure 5 of Lundahl as teaching the above-cited claim limitations. Paper No. 5, page 4. Applicants respectfully traverse.

Lundahl instead teaches performing a segmentation or cluster analysis on the Y data matrix which represents the consumers' answers to twenty demographic and lifestyle questions. Column 8, line 65 – column 9, line 1. Lundahl further teaches that that for a given number of clusters, the initial weight optimizer attempts to estimate an optimal partitioning of a data set based on some function of the data (Y) relating to cluster measure. Column 13, lines 57-60. Lundahl further teaches that for a fixed number of clusters, the higher the value of the CH index for a given data clustering, the more optimal the clustering. Column 13, line 67 – column 14, line 2.

There is no language in the cited passages that teaches determining an optimal number of clusters. Lundahl does teach estimating an optimal partitioning of a data set based on some function of the data (Y) relating to cluster measure. The Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that estimating an optimal partitioning of a data set based on some function of the data (Y) relating to cluster measure teaches determining an optimal number of clusters. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter.

1990). That is, the Examiner must provide extrinsic evidence that must make clear that estimating an optimal partitioning of a data set based on some function of the data (Y) relating to cluster measure teaches determining an optimal number of clusters, and that it would be so recognized by persons of ordinary skill. *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). Since the Examiner has not provided such evidence, the Examiner is merely relying upon his own subjective opinion which is insufficient to establish a *prima facie* case of obviousness. *See In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002); M.P.E.P. §2143. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 4, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Furthermore, there is no language in the cited passages that teaches comparing the optimal number of clusters to the actual number of clusters resulting from the clustering data processing operation. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 4, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "wherein the optimal number of clusters is determined by a maximum number of buckets for a variable" as recited in claim 5. The Examiner cites column 29, lines 50-67 and column 30, lines 1-18 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 4. Applicants respectfully traverse and assert that Lundahl instead teaches that X and Y are data matrices with dimensions nxq and nxp and a clustering analysis being performed on Y. Column 29, lines 50-52. Lundahl further teaches determining the discriminator power of variable j to distinguish between classes i_1 and i_2. Column 30, lines 1-18. There is no language in the cited passages that teaches that the optimal number of clusters is determined by a maximum number of buckets. Neither is there any language in the cited passages that teaches that the optimal number of clusters is determined by a maximum number of buckets for a variable. Therefore, the

Examiner has not presented a *prima facie* case of obviousness in rejecting claim 5, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "wherein the optimal number of clusters is set to a threshold value in case the maximum number of buckets is greater than the threshold number" as recited in claim 6. The Examiner cites column 13, lines 30-55; column 26, lines 55-67 and column 27, lines 1-10 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 4. Applicants respectfully traverse and assert that Lundahl instead teaches determining the minimum of each sublist and if there is more than one minimum then ranking the minima. Column 13, lines 30-55. Lundahl further teaches that if O_1 is not empty, the outlier with the highest density above min_{den}, $O_1(1,:)$, is chosen to become a new cluster centroid and is concatenated with other current cluster centroids. Column 26, lines 55-58. Lundahl further teaches that $O_1(2,:)$ is chosen for the new cluster centroid and the process continues until O_1 is empty and the process terminates. Column 27, lines 1-3. There is no language in the cited passages that teaches setting the optimal number of clusters to a threshold value. Neither is there any language in the cited passages that teaches setting the optimal number of clusters to a threshold value in case the maximum number of buckets is greater than the threshold number. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 6, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining a factor based on the optimal number of clusters and the actual number of clusters" as recited in claim 7. The Examiner cites column 2, lines 10-15; column 8, lines 65-67; column 9, lines 1-10 and Figure 5 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 5. Applicants respectfully traverse and assert that Lundahl instead teaches correspondence analysis, principal components analysis and factor analysis. Column

2, lines 10-11. Lundahl further teaches that performing a segmentation or cluster analysis on the Y data matrix which represents the consumers' answers to twenty demographic and lifestyle questions. Column 8, line 65 – column 9, line 1. There is no language in the cited passages that teaches determining a factor based on the optimal number of clusters. Neither is there any language in the cited passages that teaches determining a factor based on the actual number of clusters. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 7, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "multiplying the result of the comparison of the relative foreground and background frequencies with the factor" as recited in claim 7. The Examiner cites column 4, lines 6-42 and column 5, lines 24-51 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 5. Applicants respectfully traverse and assert that Lundahl instead teaches that principal components analysis represents a centered nxp matrix, X, as the product of two matrices T and P'. Column 5, lines 24-26. There is no language in the cited passages that teaches multiplying the result of the comparison of the relative foreground and background frequencies. Neither is there any language in the cited passages that teaches multiplying the result of the comparison of the relative foreground and background frequencies with the factor. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 7, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining a normalizing value being independent of any correlations between fields of the data on which the data processing operation is applied" as recited in claim 8. The Examiner cites column 12, lines 27-67 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 5. Applicants respectfully traverse and assert that Lundahl instead teaches that a

PCA model of $Y_{fillold}$ is created using the validation method to determine the "optimal" number. Column 12, lines 27-28. There is no language in the cited passage that teaches determining a normalizing value being independent of any correlations between fields of the data. Neither is there any language in the cited passages that teaches determining a normalizing value being independent of any correlations between fields of the data on which the data processing operation is applied. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 8, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "normalizing the result of the comparison of the foreground and background frequencies by means of the normalizing value" as recited in claim 8. The Examiner cites column 12, lines 27-67 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 5. Applicants respectfully traverse and assert that Lundahl instead teaches that a PCA model of $Y_{fillold}$ is created using the validation method to determine the "optimal" number. Column 12, lines 27-28. There is no language in the cited passage that teaches normalizing the result of the comparison of the foreground and background frequencies. Neither is there any language in the cited passage that teaches normalizing the result of the comparison of the foreground and background frequencies by means of the normalizing value. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 8, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "comparing the background frequencies of the buckets with an imaginary cluster having a foreground frequency of the bucket equal to one" as recited in claim 9. The Examiner cites column 7, lines 52-57 and column 12, lines 52-59 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 5. Applicants respectfully traverse and assert that Lundahl instead teaches that

if the modeling power of variable j in class i is "high", then the product of the residuals for variable j in class i must be relatively low compared to the sample variance of variable j in class i. Column 7, lines 52-55. Lundahl further teaches that comparing nrmdif with tol. Column 12, lines 54-55. There is no language in the cited passages that teaches comparing the background frequencies of the buckets with an imaginary cluster. Neither is there any language in the cited passages that teaches comparing the background frequencies of the buckets with an imaginary cluster having a foreground frequency of the bucket equal to one. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 9, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants respectfully assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "comparing the background frequencies of the buckets with an imaginary cluster having a foreground frequency of the bucket equal to zero" as recited in claim 9. The Examiner cites column 7, lines 52-57 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 5. Applicants respectfully traverse and assert that Lundahl instead teaches that if the modeling power of variable j in class i is "high", then the product of the residuals for variable j in class i must be relatively low compared to the sample variance of variable j in class i. Column 7, lines 52-55. There is no language in the cited passage that teaches comparing the background frequencies of the buckets with an imaginary cluster. Neither is there any language in the cited passage that teaches comparing the background frequencies of the buckets with an imaginary cluster having a foreground frequency of the bucket equal to zero. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 9, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "summing the results of the corresponding comparison values" as recited in claim 9. The Examiner cites column 4, lines 15-28

and column 5, lines 24-51 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 5. Applicants respectfully traverse and assert that Lundahl instead teaches that the principal components analysis represents a centered nxp matrix, X, as the product of two matrices T and P'. Column 5, lines 24-26. There is no language in the cited passages that teaches summing the results of the comparison values mentioned above. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 9, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "moving at least one record of at least one of the clusters to another cluster" as recited in claim 12. The Examiner cites column 8, lines 65-67; column 9, lines 1-20; column 13, lines 58-67 and column 14, lines 1-8 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 8. Applicants respectfully traverse and assert that Lundahl instead teaches performing a segmentation or cluster analysis on the Y data matrix which represents the consumers' answers to twenty demographic and lifestyle questions. Column 8, line 65 – column 9, line 1. Lundahl further teaches estimating an optimal partitioning of a data set based on some function of the data (Y) relating to cluster measure. Column 13, lines 58-60. Lundahl further teaches that the IWO routine can be divided into two stages, IWO_1 and IWO_2. Column 14, lines 4-6. There is no language in the cited passages that teaches moving a record of a cluster to another cluster. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 12, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "determining the quality index for the modified clusters" as recited in claim 12. The Examiner cites column 3, lines 40-46 and column 10, lines 47-67 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 8. Applicants respectfully traverse and assert that Lundahl instead

teaches a method and system that allows for the incorporation of the respective independent qualities of objects into models, qualities that define productive relationships between independent objects. Column 3, lines 43-46. Lundahl further teaches that in an example, the data analyzed could be related to e-commerce, the various data matrices including: numerical measures of the outcomes of an e-commerce sales event; common measures of qualities of an e-commerce consumer; and common measures of the qualities of the item or set of items offered to the consumer during the e-commerce sales event. Column 10, lines 47-53. There is no language in the cited passages that teaches a quality index. Neither is there any language in the cited passages that teaches determining a quality index for the modified clusters. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 12, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Applicants further assert that Lundahl and Heckerman, taken singly or in combination, do not teach or suggest "using the modified clusters as a new initial set of clusters in case the quality index improved" as recited in claim 12. The Examiner cites column 13, lines 8-67 and column 14, lines 1-8 of Lundahl as teaching the above-cited claim limitation. Paper No. 5, page 8. Applicants respectfully traverse and assert that Lundahl instead teaches that the initial weight optimizer attempts to estimate an optimal partitioning of a data set based on some function of the data (Y) relating to a cluster measure. Column 13, lines 58-60. There is no language in the cited passages that teaches using the modified clusters as a new initial set of clusters. Neither is there any language in the cited passages that teaches using the modified clusters as a new initial set of clusters in case the quality index improved. Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 12, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

As a result of the foregoing, Applicants respectfully assert that there are numerous claim limitations not taught or suggested in the cited prior art, and thus the

Examiner has not presented a *prima facie* case of obviousness for rejecting claims 1-13. M.P.E.P. §2143.
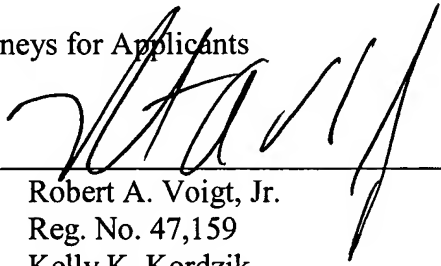
II. CONCLUSION

As a result of the foregoing, it is asserted by Applicants that claims 1-13 in the Application are in condition for allowance, and Applicants respectfully request an allowance of such claims. Applicants respectfully request that the Examiner call Applicants' attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining issues.

Respectfully submitted,

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